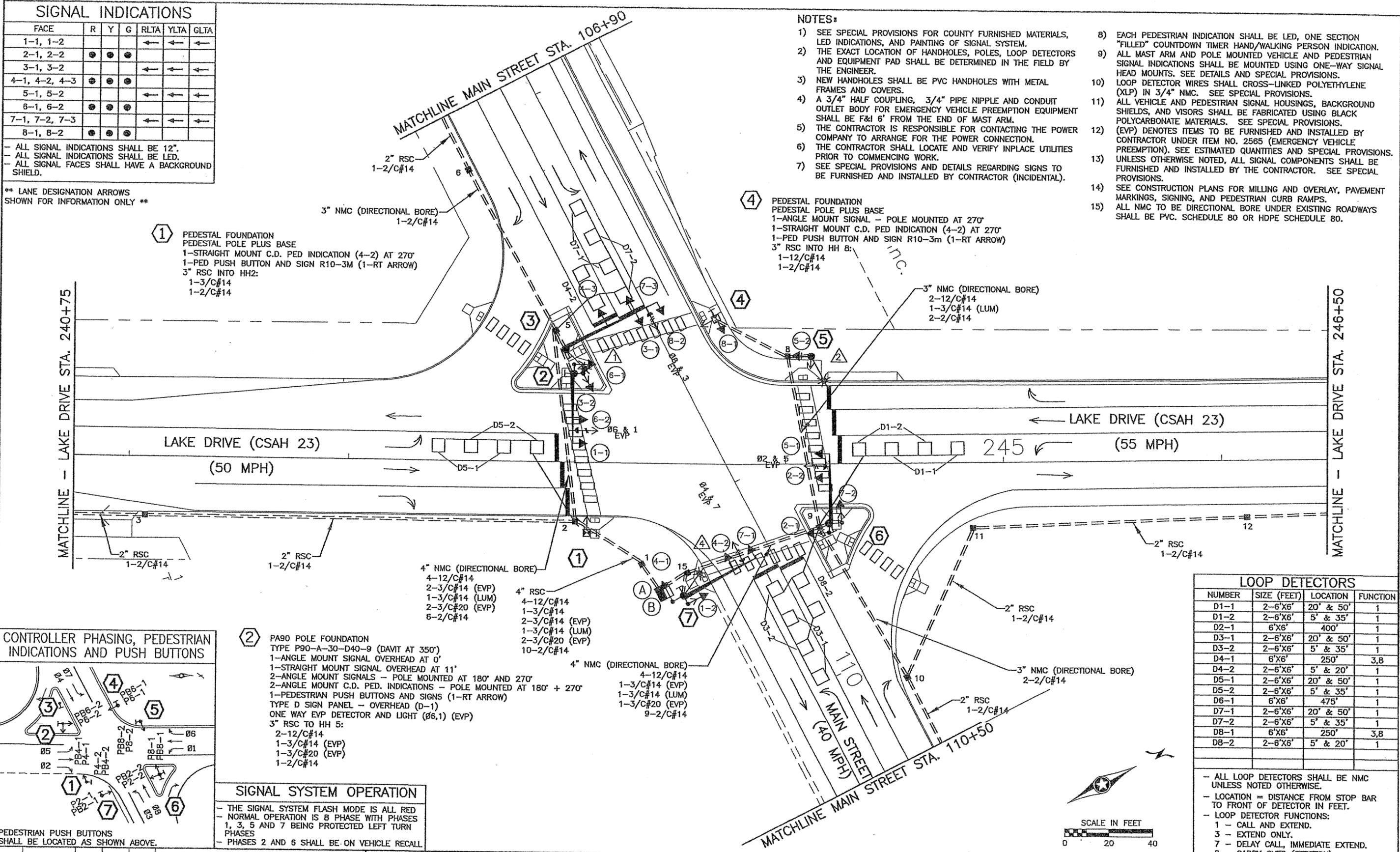


**SIGNAL INDICATIONS**

FACE	R	Y	G	RLTA	YLTA	GLTA
1-1, 1-2				←	←	←
2-1, 2-2	●	●	●			
3-1, 3-2				←	←	←
4-1, 4-2, 4-3	●	●	●			
5-1, 5-2				←	←	←
6-1, 6-2	●	●	●			
7-1, 7-2, 7-3				←	←	←
8-1, 8-2	●	●	●			

- ALL SIGNAL INDICATIONS SHALL BE 12".  
 - ALL SIGNAL INDICATIONS SHALL BE LED.  
 - ALL SIGNAL FACES SHALL HAVE A BACKGROUND SHIELD.

\*\* LANE DESIGNATION ARROWS SHOWN FOR INFORMATION ONLY \*\*



**NOTES:**

- 1) SEE SPECIAL PROVISIONS FOR COUNTY FURNISHED MATERIALS, LED INDICATIONS, AND PAINTING OF SIGNAL SYSTEM.
- 2) THE EXACT LOCATION OF HANDHOLES, POLES, LOOP DETECTORS AND EQUIPMENT PAD SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
- 3) NEW HANDHOLES SHALL BE PVC HANDHOLES WITH METAL FRAMES AND COVERS.
- 4) A 3/4" HALF COUPLING, 3/4" PIPE NIPPLE AND CONDUIT OUTLET BODY FOR EMERGENCY VEHICLE PREEMPTION EQUIPMENT SHALL BE F&I 6' FROM THE END OF MAST ARM.
- 5) THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE POWER COMPANY TO ARRANGE FOR THE POWER CONNECTION.
- 6) THE CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
- 7) SEE SPECIAL PROVISIONS AND DETAILS REGARDING SIGNS TO BE FURNISHED AND INSTALLED BY CONTRACTOR (INCIDENTAL).
- 8) EACH PEDESTRIAN INDICATION SHALL BE LED, ONE SECTION "FILLED" COUNTDOWN TIMER HAND/WALKING PERSON INDICATION.
- 9) ALL MAST ARM AND POLE MOUNTED VEHICLE AND PEDESTRIAN SIGNAL INDICATIONS SHALL BE MOUNTED USING ONE-WAY SIGNAL HEAD MOUNTS. SEE DETAILS AND SPECIAL PROVISIONS.
- 10) LOOP DETECTOR WIRES SHALL CROSS-LINKED POLYETHYLENE (XLP) IN 3/4" NMC. SEE SPECIAL PROVISIONS.
- 11) ALL VEHICLE AND PEDESTRIAN SIGNAL HOUSINGS, BACKGROUND SHIELDS, AND VISORS SHALL BE FABRICATED USING BLACK POLYCARBONATE MATERIALS. SEE SPECIAL PROVISIONS.
- 12) (EVP) DENOTES ITEMS TO BE FURNISHED AND INSTALLED BY CONTRACTOR UNDER ITEM NO. 2565 (EMERGENCY VEHICLE PREEMPTION). SEE ESTIMATED QUANTITIES AND SPECIAL PROVISIONS.
- 13) UNLESS OTHERWISE NOTED, ALL SIGNAL COMPONENTS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. SEE SPECIAL PROVISIONS.
- 14) SEE CONSTRUCTION PLANS FOR MILLING AND OVERLAY, PAVEMENT MARKINGS, SIGNING, AND PEDESTRIAN CURB RAMPS.
- 15) ALL NMC TO BE DIRECTIONAL BORE UNDER EXISTING ROADWAYS SHALL BE PVC. SCHEDULE 80 OR HDPE SCHEDULE 80.

**1** PEDESTAL FOUNDATION  
 PEDESTAL POLE PLUS BASE  
 1-STRAIGHT MOUNT C.D. PED INDICATION (4-2) AT 270°  
 1-PED PUSH BUTTON AND SIGN R10-3M (1-RT ARROW)  
 3" RSC INTO HH2:  
 1-3/C#14  
 1-2/C#14

**4** PEDESTAL FOUNDATION  
 PEDESTAL POLE PLUS BASE  
 1-ANGLE MOUNT SIGNAL - POLE MOUNTED AT 270°  
 1-STRAIGHT MOUNT C.D. PED INDICATION (4-2) AT 270°  
 1-PED PUSH BUTTON AND SIGN R10-3m (1-RT ARROW)  
 3" RSC INTO HH 8:  
 1-12/C#14  
 1-2/C#14

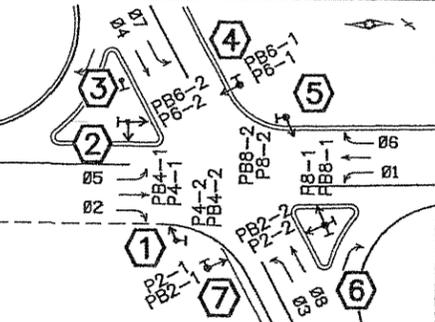
**2** PA90 POLE FOUNDATION  
 TYPE P90-A-30-D40-9 (DAVIT AT 350°)  
 1-ANGLE MOUNT SIGNAL OVERHEAD AT 0°  
 1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 11°  
 2-ANGLE MOUNT SIGNALS - POLE MOUNTED AT 180° AND 270°  
 2-ANGLE MOUNT C.D. PED. INDICATIONS - POLE MOUNTED AT 180° + 270°  
 1-PEDESTRIAN PUSH BUTTONS AND SIGNS (1-RT ARROW)  
 TYPE D SIGN PANEL - OVERHEAD (D-1)  
 ONE WAY EVP DETECTOR AND LIGHT (Ø6,1) (EVP)  
 3" RSC TO HH 5:  
 2-12/C#14  
 1-3/C#14 (EVP)  
 1-3/C#20 (EVP)  
 1-2/C#14

4" NMC (DIRECTIONAL BORE)  
 4-12/C#14  
 2-3/C#14 (EVP)  
 1-3/C#14 (LUM)  
 2-3/C#20 (EVP)  
 6-2/C#14

4" RSC  
 4-12/C#14  
 1-3/C#14  
 2-3/C#14 (EVP)  
 1-3/C#14 (LUM)  
 2-3/C#14 (EVP)  
 10-2/C#14

4" NMC (DIRECTIONAL BORE)  
 4-12/C#14  
 1-3/C#14 (EVP)  
 1-3/C#14 (LUM)  
 1-3/C#20 (EVP)  
 9-2/C#14

**CONTROLLER PHASING, PEDESTRIAN INDICATIONS AND PUSH BUTTONS**



PEDESTRIAN PUSH BUTTONS SHALL BE LOCATED AS SHOWN ABOVE.

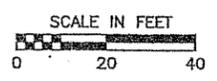
**SIGNAL SYSTEM OPERATION**

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED
- NORMAL OPERATION IS 6 PHASE WITH PHASES 1, 3, 5 AND 7 BEING PROTECTED LEFT TURN PHASES
- PHASES 2 AND 6 SHALL BE ON VEHICLE RECALL

**LOOP DETECTORS**

NUMBER	SIZE (FEET)	LOCATION	FUNCTION
D1-1	2-6'X6'	20' & 50'	1
D1-2	2-6'X6'	5' & 35'	1
D2-1	6'X6'	400'	1
D3-1	2-6'X6'	20' & 50'	1
D3-2	2-6'X6'	5' & 35'	1
D4-1	6'X6'	250'	3,8
D4-2	2-6'X6'	5' & 20'	1
D5-1	2-6'X6'	20' & 50'	1
D5-2	2-6'X6'	5' & 35'	1
D6-1	6'X6'	475'	1
D7-1	2-6'X6'	20' & 50'	1
D7-2	2-6'X6'	5' & 35'	1
D8-1	6'X6'	250'	3,8
D8-2	2-6'X6'	5' & 20'	1

- ALL LOOP DETECTORS SHALL BE NMC UNLESS NOTED OTHERWISE.  
 - LOCATION = DISTANCE FROM STOP BAR TO FRONT OF DETECTOR IN FEET.  
 - LOOP DETECTOR FUNCTIONS:  
 1 - CALL AND EXTEND.  
 3 - EXTEND ONLY.  
 7 - DELAY CALL, IMMEDIATE EXTEND.  
 8 - CARRY OVER (STRETCH).



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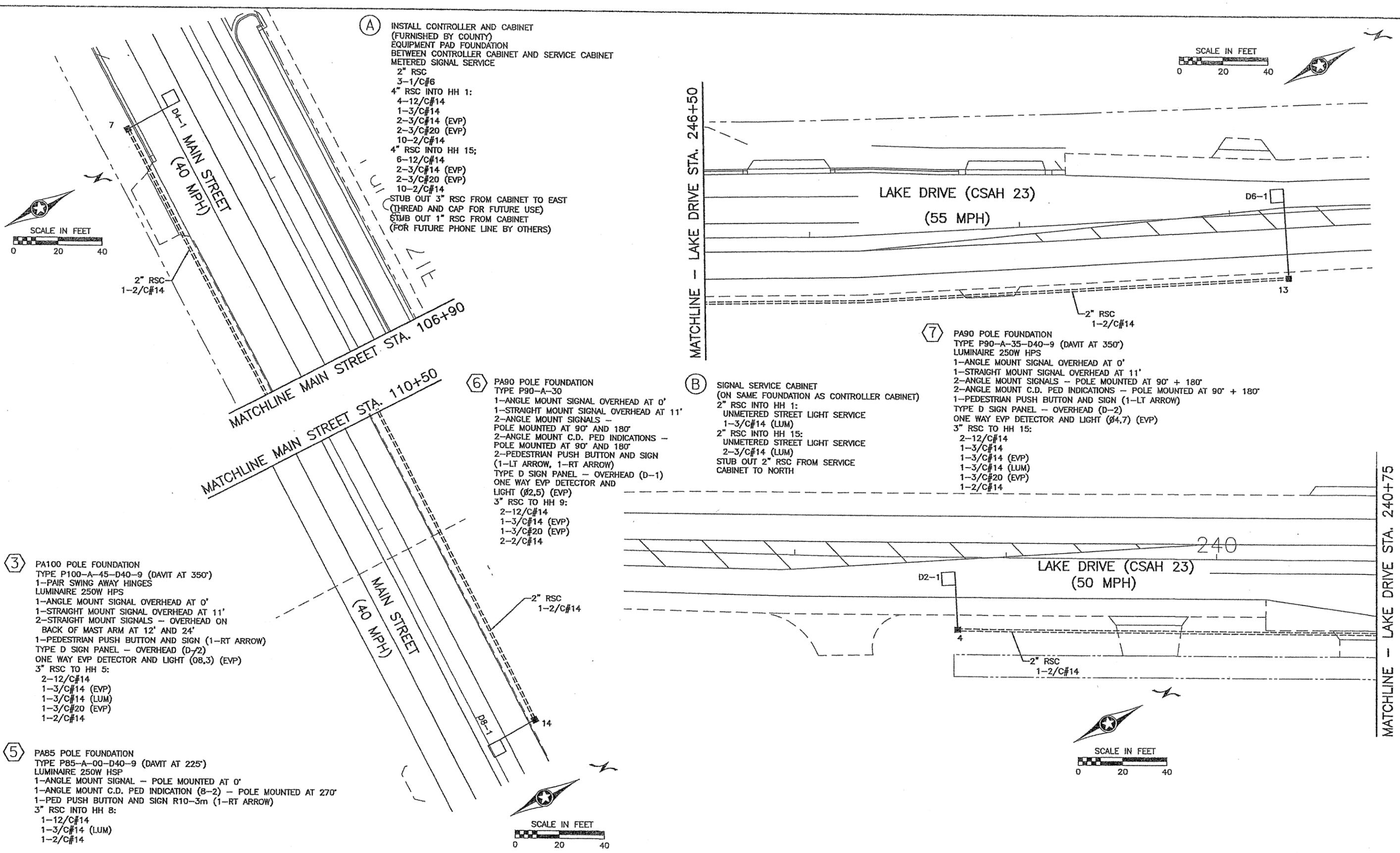
NO	DATE	BY	CHKD	APPR	REVISION

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
 SIGNATURE: *Bryant J. Fick*  
 PRINTED NAME: BRYANT J. FICK  
 DATE: JULY 23, 2012 LIC. NO. 42802

DRAWN BY \_\_\_\_\_ DATE \_\_\_\_\_  
 DESIGN BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

S.A.P. 002-614-038  
 S.A.P. 002-623-016  
 TKDA Proj. 14850.000  
 S.P.





SCALE IN FEET  
0 20 40

**(A)** INSTALL CONTROLLER AND CABINET (FURNISHED BY COUNTY)  
EQUIPMENT PAD FOUNDATION BETWEEN CONTROLLER CABINET AND SERVICE CABINET  
METERED SIGNAL SERVICE  
2" RSC  
3-1/C#6  
4" RSC INTO HH 1:  
4-12/C#14  
1-3/C#14  
2-3/C#14 (EVP)  
2-3/C#20 (EVP)  
10-2/C#14  
4" RSC INTO HH 15:  
6-12/C#14  
2-3/C#14 (EVP)  
2-3/C#20 (EVP)  
10-2/C#14  
STUB OUT 3" RSC FROM CABINET TO EAST (THREAD AND CAP FOR FUTURE USE)  
STUB OUT 1" RSC FROM CABINET (FOR FUTURE PHONE LINE BY OTHERS)

**(6)** PA90 POLE FOUNDATION  
TYPE P90-A-30  
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'  
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 11'  
2-ANGLE MOUNT SIGNALS - POLE MOUNTED AT 90° AND 180°  
2-ANGLE MOUNT C.D. PED INDICATIONS - POLE MOUNTED AT 90° AND 180°  
2-PEDESTRIAN PUSH BUTTON AND SIGN (1-LT ARROW, 1-RT ARROW)  
TYPE D SIGN PANEL - OVERHEAD (D-1)  
ONE WAY EVP DETECTOR AND LIGHT (Ø2.5) (EVP)  
3" RSC TO HH 9:  
2-12/C#14  
1-3/C#14 (EVP)  
1-3/C#20 (EVP)  
2-2/C#14

**(3)** PA100 POLE FOUNDATION  
TYPE P100-A-45-D40-9 (DAVIT AT 350°)  
1-PAIR SWING AWAY HINGES  
LUMINAIRE 250W HPS  
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'  
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 11'  
2-STRAIGHT MOUNT SIGNALS - OVERHEAD ON BACK OF MAST ARM AT 12' AND 24'  
1-PEDESTRIAN PUSH BUTTON AND SIGN (1-RT ARROW)  
TYPE D SIGN PANEL - OVERHEAD (D-2)  
ONE WAY EVP DETECTOR AND LIGHT (Ø8.3) (EVP)  
3" RSC TO HH 5:  
2-12/C#14  
1-3/C#14 (EVP)  
1-3/C#14 (LUM)  
1-3/C#20 (EVP)  
1-2/C#14

**(5)** PA85 POLE FOUNDATION  
TYPE P85-A-00-D40-9 (DAVIT AT 225°)  
LUMINAIRE 250W HSP  
1-ANGLE MOUNT SIGNAL - POLE MOUNTED AT 0'  
1-ANGLE MOUNT C.D. PED INDICATION (8-2) - POLE MOUNTED AT 270°  
1-PED PUSH BUTTON AND SIGN R10-3m (1-RT ARROW)  
3" RSC INTO HH 8:  
1-12/C#14  
1-3/C#14 (LUM)  
1-2/C#14

**(B)** SIGNAL SERVICE CABINET (ON SAME FOUNDATION AS CONTROLLER CABINET)  
2" RSC INTO HH 1:  
UNMETERED STREET LIGHT SERVICE  
1-3/C#14 (LUM)  
2" RSC INTO HH 15:  
UNMETERED STREET LIGHT SERVICE  
2-3/C#14 (LUM)  
STUB OUT 2" RSC FROM SERVICE CABINET TO NORTH

**(7)** PA90 POLE FOUNDATION  
TYPE P90-A-35-D40-9 (DAVIT AT 350°)  
LUMINAIRE 250W HPS  
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'  
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 11'  
2-ANGLE MOUNT SIGNALS - POLE MOUNTED AT 90° + 180°  
2-ANGLE MOUNT C.D. PED INDICATIONS - POLE MOUNTED AT 90° + 180°  
1-PEDESTRIAN PUSH BUTTON AND SIGN (1-LT ARROW)  
TYPE D SIGN PANEL - OVERHEAD (D-2)  
ONE WAY EVP DETECTOR AND LIGHT (Ø4.7) (EVP)  
3" RSC TO HH 15:  
2-12/C#14  
1-3/C#14  
1-3/C#14 (EVP)  
1-3/C#14 (LUM)  
1-3/C#20 (EVP)  
1-2/C#14

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NO	DATE	BY	CHKD	APPR	REVISION

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
SIGNATURE: *Bryant J. Ficek*  
PRINTED NAME: BRYANT J. FICEK  
DATE: July 23, 2012 LIC. NO. 42802

DRAWN BY \_\_\_\_\_ DATE \_\_\_\_\_  
DESIGN BY \_\_\_\_\_ DATE \_\_\_\_\_  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

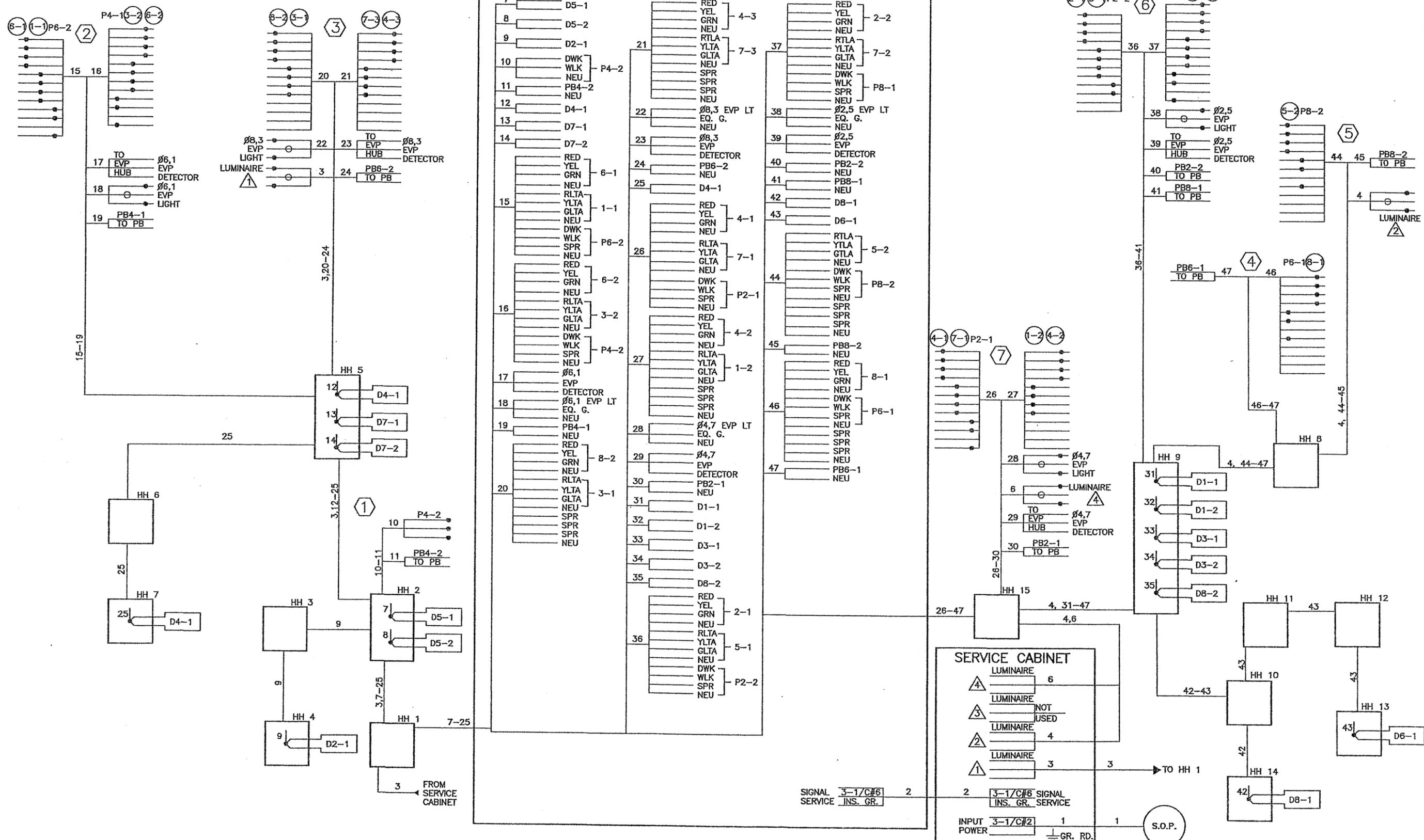
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TKDA Proj. 14850.000  
S.P.



CITY OF LINO LAKES  
LAKE/MAIN SIGNAL MATCHLINES  
SIGNAL PLAN AND DETAILS  
LAKE DR. (CSAH 23)/MAIN ST. (CSAH 14) SIGNALIZATION

SHEET  
62  
OF  
78

# CONTROLLER CABINET



DATE: 6/1/2012  
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 TKDA Proj. 14850.000  
 S.P.



**CITY OF LINO LAKES**  
 LAKE/MAIN WIRING DIAGRAM  
 SIGNAL PLAN AND DETAILS  
 LAKE DR. (CSAH 23)/MAIN ST. (CSAH 14) SIGNALIZATION

SHEET  
 63  
 OF  
 78

NO	DATE	BY	CKD	APPR	REVISION